Pond / S	pring - Ana	lysis as a	thermal heat	sink											
rah	-	Ī													
1/4/2011															
Summar	·v·														
Thormolor	y.	from pond /	apring in adagua	to											
	leigy available	nom ponu /	spring is adequa	lle											
except in n	nost extreme c	onaltions.													
Due to rem	note location ar	nd tragility of	electrical supplie	es at times of hea	avy storms										
a substanti	ial backup gas	furnace is re	quirea, which co	uld be used to s	upplement										
geotherma	il energy if nec	essary.													
Assume	d Thermal V	/alues													
Hrly btu he	at load =	50,000	btu												
Gallons pe	r cu foot=	7.4													
1 BTU rais	es 1 LB of wat	er 1 dearee F	-												
1 Gallon of	f water =	83	lb												
1 Cu Et wa	iter =	61.42	lb												
1 sf sun =	300	btu	10												
1 gallon of	water 1 degree		0	DTII											
1 galloff of	water ruegree	-	0	ыо											
Calar agin	in color system		mad to be 200/	less at 45 degre	a angla 500/	the new order wine of									
Solar gain	in solar system	i usualiy assi		loss at 45 degre	e angle, 50%	unrougn wind	ows								
		L	Ι.												
Observed	Conditions at	pond and s	prings												
Water flow	from 2 springs	s 1 to 30 gpm	with minimal flo	w June - Sept					l						
Springs flo	w all winter, su	rface 1 1/2 ir	hch tubing remain	ns ice free and n	nelts snow ove	er it showing	a depression u	ntil snow is o	ver 18 inches						
Pond wate	r temps at spri	ng flow rates	of 1 to 20 gpm												
High flow -	37 degrees, a	ir temp consi	stently in low to r	mid 20's day, lov	v teens night										
ice varied f	from fringe of p	ond to 50%	surface.												
Low flow - 70 degrees															
Additional	spring waters a	available on s	ite requiring pun	nping (app 8 foo	t head) app. 1	- 8 gpm									
Thermal	Contributio	on per Sou	irce												
Heating M	ode														
Cooling Mo	ode = Half heat	ing load and	2 to 25 tons												
Cooling with		ing load, app	2 10 2.3 10113												
			Total avail the	rmal anaray na	r dov	Dond	Spring	Dond		Solar Dond	Solar Cain				
			TOLAI AVAII LITE	rmai energy pe	ruay	Pollu	Spring	Thermal real	harra	Solar Portu	Solar Gain				
						Static	now gpm	i nermai recharge		Static	per Day				
							15	1/2 normal activity is an							
								1/∠ normal earth loop							
								Normal	Pond loop						
length						40		⊢arth		30	30				
width						20		Loop		15	15				
depth						4				1	300	gross btu p	er sf		
cu ft						3,200				225	67,500	net btu/hr	50% collection e	fficiency	
gal						23,680	21,600			1,665	405,000	net btu per	6 hr direct sun 10 am t	o 4 pm	
lbs					196,544	179,280			13,820	30	Delta T deg F for one change of water in solar po			r pond	
btu per deg	gree F			Typical Htg		196,544	179,280			13,820	8	Delta T deg	F for four changes of	water in sol	lar pond
btu per	10	degree F	MIN	Season Avg	MAX	1,965,440	1,792,800	1,200,000	600,000	138,195		Ì			
heating hrs	s available	-	18.43	47.68	122.0	39.3	35.9	24.0	12.0	2.8	8.1				
heating da	ys available		0.77	1.99	5.08	1.64	1.49	1.00	0.50	0.12	0.34				
				Typical Coolin	a										
	1		MIN	Season Avo	мах	1	1			1					
heating day	vs available		0.38	(note assumed	from minim	al flow rate a	and recharge f	from soil bas	sin / soil cont	act)					
	,		0.00												
	1		1	+	+		1	1		1	1				
1	1	1	1	1	1	1	1	1	1	1	1	L		1	1